



Case Study

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Construction Fill Sand Production from Bottom Ash At Mill Creek Station

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A collaborative effort between Louisville Gas and Electric (LG&E), Charah Environmental Inc., and the University of Kentucky Center for Applied Energy Research (CAER) has demonstrated the successful use of bottom ash as graded construction backfill sand for a host of construction applications. Proper beneficiation, quality control, marketing and environmental testing of this material has resulted in the beneficial reuse of over 100,000 tons of bottom ash over the past year with an additional 200,000 tons anticipated this year.

Bottom ash produced at LG&E's Mill Creek Station in Louisville, Kentucky has historically been stored in an on-site storage pond along with hard coal and pyrite rejected from the coal pulverizers. The bottom ash produced at Mill Creek has historically been of higher density than that of other power plants, primarily attributed to the exclusive use of high sulfur coal fuel at this site. The high ash density combined with the presence of pyrite and coal precluded the use of this ash as lightweight aggregate, a product that Charah produces at several other utility stations.

Market research by Charah and LG&E identified a significant utilization potential as graded backfill for sanitary sewer construction projects in the Louisville area. In order to be considered for use in this application, it would be necessary to develop a cost-effective beneficiation process to remove impurities (i.e. coal and pyrite) while providing the grading and compaction requirements of the fill to satisfy potential users. In addition, it would be necessary to verify that any acid generating or trace element contamination potential from this material would be minimized or eliminated.

Bottom ash characterization and beneficiation studies by CAER indicated that technologies typically used for bottom ash processing would be insufficient to provide the pyrite rejection necessary to meet product quality targets. Alternative approaches were evaluated and a final approach was selected. Pilot-scale demonstration of the unit processes were completed to generate samples for environmental testing which consisted of comprehensive elemental analyses along with extensive batch and column leaching testing under a variety of conditions. The results of these analyses were presented in a series of presentations to the Louisville Metropolitan Sewer District (MSD), Greater Louisville Chamber of Commerce Environmental Affairs Committee and Kentucky Department of Transportation Division of Materials to allay concerns about compatibility of the processed ash with any materials that it would come into contact with such as sewer pipes and road bases. Instrumental to the approval and acceptance of this material was Flynn Brothers Construction of Louisville who was responsible for placement of the fill in the sewer trenches.

At the present time, Charah has installed the processing capabilities to produce 200,000 tpy of graded fill from the bottom ash at Mill Creek. Charah installed a separate line to accept all of the daily production of bottom ash and an additional line to separately store mill rejects. To meet demand, a dredge was commissioned to reclaim stored bottom ash and feed it into the processing plant. It was also necessary to improve the efficiency of the processing plant insure rejection of pyrite from the dredged ash. Quality control is maintained by regular sampling and leaching analyses.

The principle lesson learned from this successful endeavor was that the cooperation of all parties was a prerequisite for success. Lack of cooperation on the part of any single entity



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would have seriously hampered, if not eliminated the success that has been realized. As such, all of the bottom ash that is produced at Mill Creek is currently being utilized beneficially and material that has been stored for the past 20 years is in the process of being reclaimed to meet demand.

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This coal ash utilization case study is a selection of the Coal Combustion Product Partnership. For more information, consult the C2P2 web site at <http://www.epa.gov/epaoswer/osw/conserves/c2p2/>